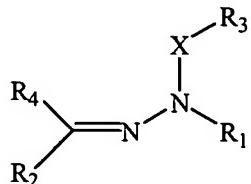


## CLAIMS

What is claimed is:

1. An organophotoreceptor comprising an electrically conductive substrate  
2 and a photoconductive element on the electrically conductive substrate, the  
3 photoconductive element comprising:

- 4 (a) a charge transport compound having the formula



6 R<sub>1</sub> is an aromatic group, an alkyl group, an alkenyl group, or a  
7 heterocyclic group;

8 R<sub>2</sub> comprises an (N,N-disubstituted)arylamine group;

9 R<sub>3</sub> comprises an epoxy group;

10 R<sub>4</sub> is H, an aromatic group, an alkyl group, an alkenyl group, or a  
11 heterocyclic group; and

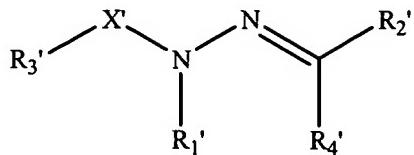
12 X is a first linking group; and

- 13 (b) a charge generating compound.

- 1 2. An organophotoreceptor according to claim 1 wherein the (N,N-  
2 disubstituted)arylamine group is selected from the group consisting of a p-(N,N-  
3 disubstituted)aryl amine group, a carbazole, and a julolidine group.

- 1 3. An organophotoreceptor according to claim 1 wherein X is a -(CH<sub>2</sub>)<sub>m</sub>-  
2 group, where m is an integer between 1 and 30, inclusive, and one or more of the  
3 methylene groups is optionally replaced by O, S, N, C, B, P, C=O, O=S=O, a  
4 heterocyclic group, an aromatic group, urethane, urea, an ester group, an NR<sub>6</sub> group, a  
5 CR<sub>7</sub>, or a CR<sub>8</sub>R<sub>9</sub> group where R<sub>6</sub>, R<sub>7</sub>, R<sub>8</sub>, and R<sub>9</sub> are, each independently, a bond, H,  
6 hydroxyl, thiol, carboxyl, an amino group, an alkyl group, an alkenyl group, a  
7 heterocyclic group, an aromatic group, or part of a ring group.

4. An organophotoreceptor according to claim 1 wherein  $R_2$  has the formula



where R<sub>1</sub>' is an aromatic group, an alkyl group, an alkenyl group, or a heterocyclic group;

R<sub>2</sub>' is selected from the group consisting of a carbazole group or a p-(N,N-disubstituted)arylamine group;

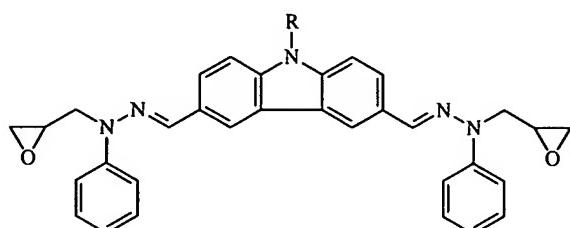
$R_3'$  comprises an epoxy, a hydroxyl, a thiol, a carboxyl or an amine group;

8 R<sub>4'</sub> is H, an aromatic group, an alkyl group, an alkenyl group, or a heterocyclic  
9 group; and

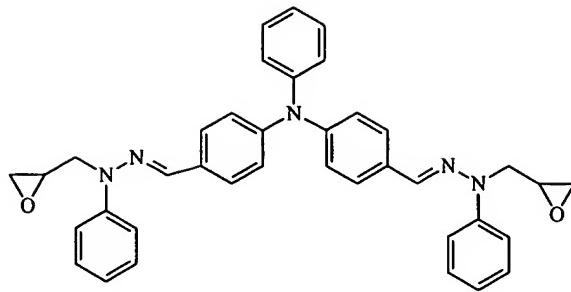
10            X' is a second linking group.

5. An organophotoreceptor according to claim 4 wherein X' is a -(CH<sub>2</sub>)<sub>n</sub>-  
group, where n is an integer between 1 and 30, inclusive, and one or more of the  
methylene groups is optionally replaced by O, S, N, C, B, P, C=O, O=S=O, a  
heterocyclic group, an aromatic group, urethane, urea, an ester group, an NR<sub>6</sub> group, a  
CR<sub>7</sub>, or a CR<sub>8</sub>R<sub>9</sub> group where R<sub>6</sub>, R<sub>7</sub>, R<sub>8</sub>, and R<sub>9</sub> are, each independently, a bond, H,  
hydroxyl, thiol, carboxyl, an amino group, an alkyl group, an alkenyl group, a  
heterocyclic group, an aromatic group, or part of a ring group.

1           6. An organophotoreceptor according to claim 5 wherein the charge transport  
2 compound is selected from the group consisting of:



5 where R is hydrogen, an alkyl group, an aromatic group, or a heterocyclic group,  
6 and



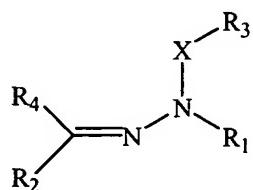
7

1               7. An organophotoreceptor according to claim 1 further comprising  
2 an electron transport compound.

1               8. An organophotoreceptor according to claim 1 wherein the  
2 organophotoreceptor is in the form of a drum or a belt.

1               9. An organophotoreceptor according to claim 1 comprising:  
2               (a) a charge transport layer comprising the charge transport compound  
3 and a polymeric binder; and  
4               (b) a charge generating layer comprising the charge generating compound and a  
5 polymeric binder.

1               10. An electrophotographic imaging apparatus comprising:  
2               (a) a light imaging component; and  
3               (b) an organophotoreceptor oriented to receive light from the light  
4 imaging component, the organophotoreceptor comprising an electrically  
5 conductive substrate and a photoconductive element on the electrically conductive  
6 substrate, the photoconductive element comprising:  
7               (i) a charge transport compound having the formula



8  
9               R<sub>1</sub> is an aromatic group, an alkyl group, an alkenyl group, or a heterocyclic group;

10 R<sub>2</sub> comprises an (N,N-disubstituted)arylamine group;  
11 R<sub>3</sub> comprises an epoxy group;  
12 R<sub>4</sub> is H, an aromatic group, an alkyl group, an alkenyl group, or a heterocyclic  
13 group; and  
14 X is a first linking group; and  
15 (ii) a charge generating compound.

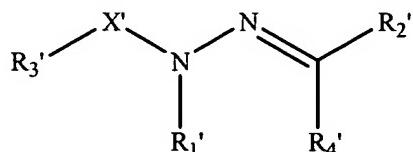
1           11. An electrophotographic imaging apparatus of claim 10 wherein the (N,N-  
2 disubstituted)arylamine group is selected from the group consisting of a p-(N,N-  
3 disubstituted)aryl amine group, a carbazole, and a julolidine group.

1           12. An electrophotographic imaging apparatus of claim 10 wherein X is  
2 a -(CH<sub>2</sub>)<sub>m</sub>- group, where m is an integer between 1 and 30, inclusive, and one or more of  
3 the methylene groups is optionally replaced by O, S, N, C, B, P, C=O, O=S=O, a  
4 heterocyclic group, an aromatic group, urethane, urea, an ester group, an NR<sub>6</sub> group, a  
5 CR<sub>7</sub>, or a CR<sub>8</sub>R<sub>9</sub> group where R<sub>6</sub>, R<sub>7</sub>, R<sub>8</sub>, and R<sub>9</sub> are, each independently, a bond, H,  
6 hydroxyl, thiol, carboxyl, an amino group; an alkyl group, an alkenyl group, a  
7 heterocyclic group, an aromatic group, or part of a ring group.

1           13. An electrophotographic imaging apparatus of claim 10 further comprising a  
2 toner dispenser.

1                   14. An electrophotographic imaging apparatus of claim 10 wherein the  
2                   organophotoreceptor further comprises an electron transport compound.

1            15. An electrophotographic imaging apparatus of claim 10 wherein R<sub>2</sub> has the  
2 formula



4           where  $R_1'$  is an aromatic group, an alkyl group, an alkenyl group, or a  
 5       heterocyclic group;

6            $R_2'$  is selected from the group consisting of a carbazole group or a p-(N,N-  
 7       disubstituted)arylamine group;

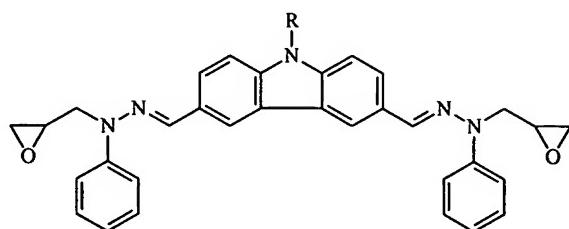
8            $R_3'$  comprises an epoxy group, a hydroxyl group, a thiol group, a carboxyl group,  
 9       or an amine group;

10           $R_4'$  is H, an aromatic group, an alkyl group, an alkenyl group, or a heterocyclic  
 11       group; and

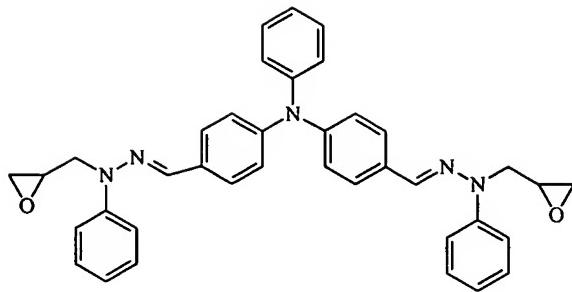
12           $X'$  is a second linking group.

1           16. An electrophotographic imaging apparatus of claim 15 wherein  $X'$  is  
 2       a  $-(CH_2)_n-$  group, where n is an integer between 1 and 30, inclusive, and one or more of  
 3       the methylene groups is optionally replaced by O, S, N, C, B, P, C=O, O=S=O, a  
 4       heterocyclic group, an aromatic group, urethane, urea, an ester group, an  $NR_6$  group, a  
 5        $CR_7$ , or a  $CR_8R_9$  group where  $R_6$ ,  $R_7$ ,  $R_8$ , and  $R_9$  are, each independently, a bond, H,  
 6       hydroxyl, thiol, carboxyl, an amino group, an alkyl group, an alkenyl group, a  
 7       heterocyclic group, an aromatic group, or part of a ring group.

1           17. An electrophotographic imaging apparatus of claim 16 wherein the charge  
 2       transport compound is selected from the group consisting of:



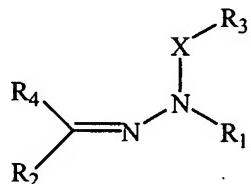
3  
 4       where R is hydrogen, an alkyl group, an aromatic group, or a heterocyclic group, and



1        18. An electrophotographic imaging process comprising:

2              (a) applying an electrical charge to a surface of an organophotoreceptor  
3 comprising an electrically conductive substrate and a photoconductive element on the  
4 electrically conductive substrate, the photoconductive element comprising:

5                  (i) a charge transport compound having the formula



7         $\text{R}_1$  is an aromatic group, an alkyl group, an alkenyl group, or a heterocyclic group;

8         $\text{R}_2$  comprises an (N,N-disubstituted)arylamine group;

9         $\text{R}_3$  comprises an epoxy group;

10       $\text{R}_4$  is H, an aromatic group, an alkyl group, an alkenyl group, or a heterocyclic  
11 group; and

12      X is a first linking group; and

13                  (ii) a charge generating compound;

14              (b) imagewise exposing the surface of the organophotoreceptor to  
15 radiation to dissipate charge in selected areas and thereby form a pattern of  
16 charged and uncharged areas on the surface;

17              (c) contacting the surface with a toner to create a toned image; and

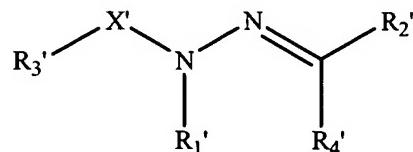
18              (d) transferring the toned image to a substrate.

1           19. An electrophotographic imaging process of claim 18 wherein the (N,N-  
2 disubstituted)arylamine group is selected from the group consisting of a p-(N,N-  
3 disubstituted)aryl amine group, a carbazole, and a julolidine group.

1           20. An electrophotographic imaging process of claim 18 wherein X is  
2 a -(CH<sub>2</sub>)<sub>m</sub>- group, where m is an integer between 1 and 30, inclusive, and one or more of  
3 the methylene groups is optionally replaced by O, S, N, C, B, P, C=O, O=S=O, a  
4 heterocyclic group, an aromatic group, urethane, urea, an ester group, an NR<sub>6</sub> group, a  
5 CR<sub>7</sub>, or a CR<sub>8</sub>R<sub>9</sub> group where R<sub>6</sub>, R<sub>7</sub>, R<sub>8</sub>, and R<sub>9</sub> are, each independently, a bond, H,  
6 hydroxyl, thiol, carboxyl, an amino group, an alkyl group, an alkenyl group, a  
7 heterocyclic group, an aromatic group, or part of a ring group.

1           21. An electrophotographic imaging process of claim 18 wherein the  
2 organophotoreceptor further comprises an electron transport compound.

1           22. An electrophotographic imaging process of claim 18 wherein R<sub>2</sub> has the  
2 formula



4           where R<sub>1</sub>' is an aromatic group, an alkyl group, an alkenyl group, or a  
5 heterocyclic group;

6           R<sub>2</sub>' is selected from the group consisting of a carbazole group or a p-(N,N-  
7 disubstituted)arylamine group;

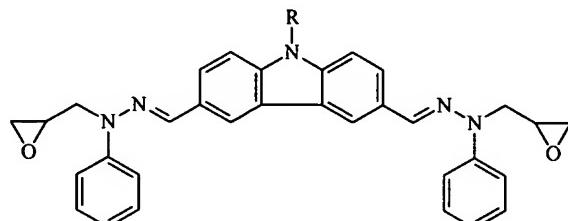
8           R<sub>3</sub>' comprises an epoxy group, a hydroxyl group, a thiol group, a carboxyl group,  
9 or an amine group;

10          R<sub>4</sub>' is H, an aromatic group, an alkyl group, an alkenyl group, or a heterocyclic  
11 group; and

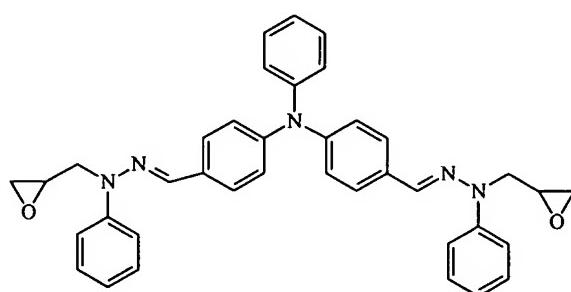
12          X' is a second linking group.

1           23. An organophotoreceptor according to claim 22 wherein X' is a -(CH<sub>2</sub>)<sub>n</sub>-  
 2 group, where n is an integer between 1 and 30, inclusive, and one or more of the  
 3 methylene groups is optionally replaced by O, S, N, C, B, P, C=O, O=S=O, a  
 4 heterocyclic group, an aromatic group, urethane, urea, an ester group, an NR<sub>6</sub> group, a  
 5 CR<sub>7</sub>, or a CR<sub>8</sub>R<sub>9</sub> group where R<sub>6</sub>, R<sub>7</sub>, R<sub>8</sub>, and R<sub>9</sub> are, each independently, a bond, H,  
 6 hydroxyl, thiol, carboxyl, an amino group, an alkyl group, an alkenyl group, a  
 7 heterocyclic group, an aromatic group, or part of a ring group.

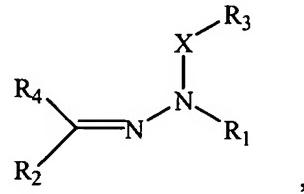
1           24. An electrophotographic imaging process of claim 23 wherein the charge  
 2 transport compound is selected from the group consisting of:



3  
 4 where R is hydrogen, an alkyl group, an aromatic group, or a heterocyclic group, and



5  
 1           25. A charge transport compound having the formula



2  
 3 where R<sub>1</sub> is an aromatic group, an alkyl group, an alkenyl group, or a heterocyclic  
 4 group;

5           R<sub>2</sub> comprises an (N,N-disubstituted)arylamine group;

6           R<sub>3</sub> comprises an epoxy group;

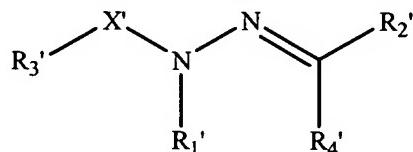
7           R<sub>4</sub> is H, an aromatic group, an alkyl group, an alkenyl group, or a heterocyclic  
8 group; and

9           X is a first linking group.

1           26. A charge transport compound of claim 25 wherein the (N,N-disubstituted)  
2 arylamine group is selected from the group consisting of a p-(N,N-disubstituted)aryl  
3 amine group, a carbazole, and a julolidine group.

1           27. An electrophotographic imaging process of claim 25 wherein X is  
2 a -(CH<sub>2</sub>)<sub>m</sub>- group, where m is an integer between 1 and 30, inclusive, and one or more of  
3 the methylene groups is optionally replaced by O, S, N, C, B, P, C=O, O=S=O, a  
4 heterocyclic group, an aromatic group, urethane, urea, an ester group, an NR<sub>6</sub> group, a  
5 CR<sub>7</sub>, or a CR<sub>8</sub>R<sub>9</sub> group where R<sub>6</sub>, R<sub>7</sub>, R<sub>8</sub>, and R<sub>9</sub> are, each independently, a bond, H,  
6 hydroxyl, thiol, carboxyl, an amino group, an alkyl group, an alkenyl group, a  
7 heterocyclic group, an aromatic group, or part of a ring group.

1           28. A charge transport compound of claim 25 wherein R<sub>2</sub> has the formula



3           where R<sub>1</sub>' is an aromatic group, an alkyl group, an alkenyl group, or a  
4 heterocyclic group;

5           R<sub>2</sub>' is selected from the group consisting of a carbazole group or a p-(N,N-  
6 disubstituted)arylamine group;

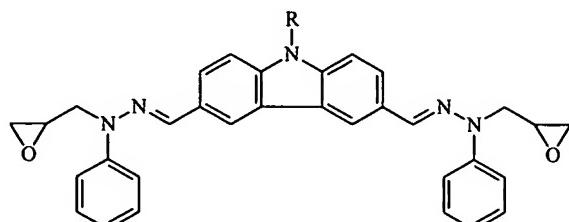
7           R<sub>3</sub>' comprises an epoxy group, a hydroxyl group, a thiol group, a carboxyl group,  
8 or an amine group;

9           R<sub>4</sub>' is H, an aromatic group, an alkyl group, an alkenyl group, or a heterocyclic  
10 group; and

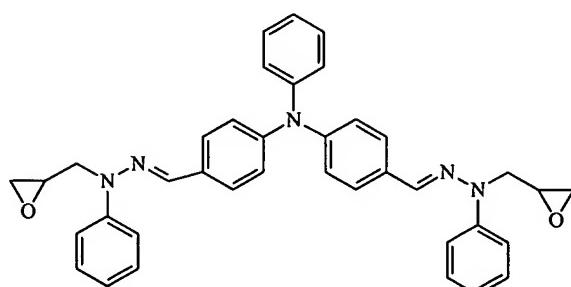
11          X' is a second linking group.

1           29. A charge transport compound of claim 28 wherein X' is a -(CH<sub>2</sub>)<sub>n</sub>- group,  
 2 where n is an integer between 1 and 30, inclusive, and one or more of the methylene  
 3 groups is optionally replaced by O, S, N, C, B, P, C=O, O=S=O, a heterocyclic group, an  
 4 aromatic group, urethane, urea, an ester group, an NR<sub>6</sub> group, a CR<sub>7</sub>, or a CR<sub>8</sub>R<sub>9</sub> group  
 5 where R<sub>6</sub>, R<sub>7</sub>, R<sub>8</sub>, and R<sub>9</sub> are, each independently, a bond, H, hydroxyl, thiol, carboxyl, an  
 6 amino group, an alkyl group, an alkenyl group, a heterocyclic group, an aromatic group,  
 7 or part of a ring group.

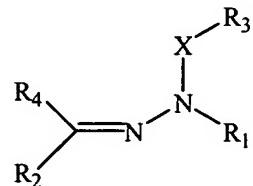
1           30. A charge transport compound of claim 29 wherein the charge transport  
 2 compound is selected from the group consisting of:



3  
 4 where R is hydrogen, an alkyl group, an aromatic group, or a heterocyclic group, and



1           31. A charge transport composition prepared by the reaction of at least a  
 2 reactive functionality of a functional binder with at least an epoxy ring in a compound  
 3 having the formula



4  
 5 where R<sub>1</sub> is an aromatic group, an alkyl group, an alkenyl group, or a heterocyclic  
 6 group;

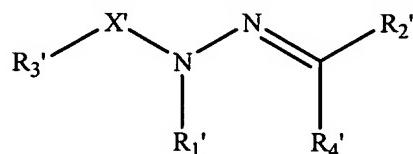
7           R<sub>2</sub> comprises an (N,N-disubstituted)arylamine group;  
8           R<sub>3</sub> comprises an epoxy group;  
9           R<sub>4</sub> is H, an aromatic group, an alkyl group, an alkenyl group, or a heterocyclic  
10          group; and  
11          X is a first linking group.

1           32. A charge transport composition of claim 31 wherein the reactive  
2          functionality is selected from the group consisting of hydroxyl, thiol, carboxyl, and an  
3          amino group.

1           33. A charge transport composition of claim 31 wherein the (N,N-  
2          disubstituted)arylamine group is selected from the group consisting of a p-(N,N-  
3          disubstituted)aryl amine group, a carbazole, and a julolidine group.

1           34. A charge transport composition of claim 31 wherein X is a -(CH<sub>2</sub>)<sub>m</sub>-  
2          group, where m is an integer between 1 and 30, inclusive, and one or more of the  
3          methylene groups is optionally replaced by O, S, N, C, B, P, C=O, O=S=O, a  
4          heterocyclic group, an aromatic group, urethane, urea, an ester group, an NR<sub>6</sub> group, a  
5          CR<sub>7</sub>, or a CR<sub>8</sub>R<sub>9</sub> group where R<sub>6</sub>, R<sub>7</sub>, R<sub>8</sub>, and R<sub>9</sub> are, each independently, a bond, H,  
6          hydroxyl, thiol, carboxyl, an amino group, an alkyl group, an alkenyl group, a  
7          heterocyclic group, an aromatic group, or part of a ring group.

1           35. A charge transport composition of claim 31 wherein R<sub>2</sub> has the formula



2           where R<sub>1</sub>' is an aromatic group, an alkyl group, an alkenyl group, or a  
3          heterocyclic group;

5           R<sub>2</sub>' is selected from the group consisting of a carbazole group or a p-(N,N-  
6          disubstituted)arylamine group;

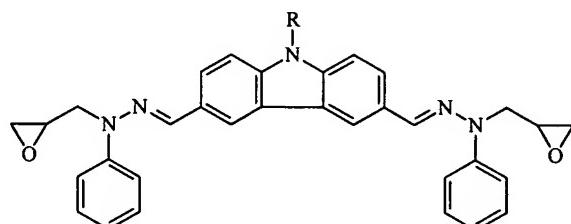
7           R<sub>3</sub>' comprises an epoxy group, a hydroxyl group, a thiol group, a carboxyl group,  
8 or an amine group;

9           R<sub>4</sub>' is H, an aromatic group, an alkyl group, an alkenyl group, or a heterocyclic  
10 group; and

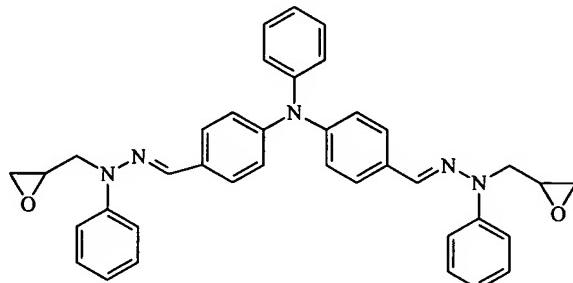
11           X' is a second linking group.

1           36.   A charge transport composition of claim 35 wherein X' is a -(CH<sub>2</sub>)<sub>n</sub>-  
2 group, where n is an integer between 1 and 30, inclusive, and one or more of the  
3 methylene groups is optionally replaced by O, S, N, C, B, P, C=O, O=S=O, a  
4 heterocyclic group, an aromatic group, urethane, urea, an ester group, an NR<sub>6</sub> group, a  
5 CR<sub>7</sub>, or a CR<sub>8</sub>R<sub>9</sub> group where R<sub>6</sub>, R<sub>7</sub>, R<sub>8</sub>, and R<sub>9</sub> are, each independently, a bond, H,  
6 hydroxyl, thiol, carboxyl, an amino group, an alkyl group, an alkenyl group, a  
7 heterocyclic group, an aromatic group, or part of a ring group.

1           37.   A charge transport composition of claim 36 wherein the charge transport  
2 compound is selected from the group consisting of:



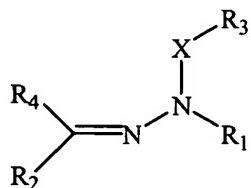
3  
4           where R is hydrogen, an alkyl group, an aromatic group, or a heterocyclic group, and



5

1       38. An organophotoreceptor comprising an electrically conductive substrate  
2 and a photoconductive element on the electrically conductive substrate, the  
3 photoconductive element comprising:

4             (a) a polymeric charge transport compound prepared by the reaction of at  
5 least a reactive functionality of a functional binder with at least an epoxy ring in a  
6 compound having the formula



7             R<sub>1</sub> is an aromatic group, an alkyl group, an alkenyl group, or a heterocyclic group;  
8 R<sub>2</sub> comprises an (N,N-disubstituted)arylamine group;  
9 R<sub>3</sub> comprises an epoxy group;  
10 R<sub>4</sub> is H, an aromatic group, an alkyl group, an alkenyl group, or a heterocyclic  
11 group; and  
12 X is a first linking group; and

13             (b) a charge generating compound.

1       39. An organophotoreceptor according to claim 38 wherein the  
2 photoconductive element further comprises an electron transport compound.

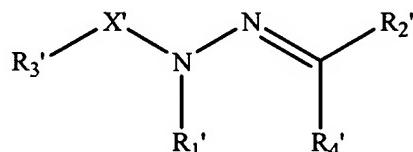
1       40. An organophotoreceptor according to claim 38 wherein the reactive  
2 functionality of the binder is selected from the group consisting of hydroxyl, carboxyl  
3 group, thiol, and an amino group.

1       41. An organophotoreceptor according to claim 38 wherein the (N,N-  
2 disubstituted)arylamine group is selected from the group consisting of a p-(N,N-  
3 disubstituted)aryl amine group, a carbazole, and a julolidine group.

1       42. An organophotoreceptor according to claim 38 wherein X is a -(CH<sub>2</sub>)<sub>m</sub>-  
2 group, where m is an integer between 1 and 30, inclusive, and one or more of the  
3 methylene groups is optionally replaced by O, S, N, C, B, P, C=O, O=S=O, a

4 heterocyclic group, an aromatic group, urethane, urea, an ester group, an NR<sub>6</sub> group, a  
 5 CR<sub>7</sub>, or a CR<sub>8</sub>R<sub>9</sub> group where R<sub>6</sub>, R<sub>7</sub>, R<sub>8</sub>, and R<sub>9</sub> are, each independently, a bond, H,  
 6 hydroxyl, thiol, carboxyl, an amino group, an alkyl group, an alkenyl group, a  
 7 heterocyclic group, an aromatic group, or part of a ring group.

1       43. An organophotoreceptor according to claim 38 wherein R<sub>2</sub> has the formula



2       where R<sub>1</sub>' is an aromatic group, an alkyl group, an alkenyl group, or a  
 3 heterocyclic group;

5       R<sub>2</sub>' is selected from the group consisting of a carbazole group or a p-(N,N-  
 6 disubstituted)arylamine group;

7       R<sub>3</sub>' comprises an epoxy group, a hydroxyl group, a thiol group, a carboxyl group,  
 8 or an amine group;

9       R<sub>4</sub>' is H, an aromatic group, an alkyl group, an alkenyl group, or a heterocyclic  
 10 group; and

11       X' is a second linking group.

1       44. An organophotoreceptor according to claim 43 wherein X' is a -(CH<sub>2</sub>)<sub>n</sub>-  
 2 group, where n is an integer between 1 and 30, inclusive, and one or more of the  
 3 methylene groups is optionally replaced by O, S, N, C, B, P, C=O, O=S=O, a  
 4 heterocyclic group, an aromatic group, urethane, urea, an ester group, an NR<sub>6</sub> group, a  
 5 CR<sub>7</sub>, or a CR<sub>8</sub>R<sub>9</sub> group where R<sub>6</sub>, R<sub>7</sub>, R<sub>8</sub>, and R<sub>9</sub> are, each independently, a bond, H,  
 6 hydroxyl, thiol, carboxyl, an amino group, an alkyl group, an alkenyl group, a  
 7 heterocyclic group, an aromatic group, or part of a ring group.

1       45. An organophotoreceptor according to claim 44 wherein the charge  
 2 transport compound is selected from the group consisting of:

